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10/619,181

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EXAMINER

LAZORCIK, JASON L

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/619,181	<b>Applicant(s)</b> TAKAHASHI ET AL.	
	<b>Examiner</b> JASON L. LAZORCIK	<b>Art Unit</b> 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 June 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 7,8,12-17 and 20-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7,8,12-17 and 20-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>02/05/2008</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Information Disclosure Statement*

The information disclosure statement filed October 11, 2007 fails to comply with 37 CFR 1.98(a)(1), which requires the following: **(1) a list of all patents, publications, applications, or other information submitted for consideration by the Office;** (2) U.S. patents and U.S. patent application publications listed in a section separately from citations of other documents; (3) the application number of the application in which the information disclosure statement is being submitted on each page of the list; (4) a column that provides a blank space next to each document to be considered, for the examiner's initials; and (5) a heading that clearly indicates that the list is an information disclosure statement. The information disclosure statement has been placed in the application file, but the information referred to therein has not been considered.

In a telephone conversation with Alan Kasper (Reg. No. 25,426) on September 26, 2008, Applicants representative was advised that that the documents dated October 11, 2007 and of record as of the time of the instant communication do not constitute a proper IDS filing. With respect to this matter, Applicant is directed to the EFS acknowledgement receipt dated October 11, 2007 which acknowledges receipt of four (4) foreign references, namely documents 1-4, one (1) Information Disclosure Statement (IDS) of four pages in length, and one (1) fee worksheet. The IDS document (e.g. Document Number 5) has been carefully reviewed and as noted above, said document fails to comply with 37 CFR 1.98(a)(1). The Examiners position on the matter stands as previously set forth in the Official Action dated February 13, 2008.

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 28 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Regarding Applicants newly submitted claim 28, no supporting basis has been found in the Specification as originally filed for the limitation requiring a step of "carrying out a precision polishing step on the main surface of the glass surface with a predetermined polishing-off amount" nor for the step requiring that the inspecting step is "carried out by monitoring the main surface mirror-finished by the precision polishing step". Further, there is no indication in the Specification to support the claimed determination procedure wherein a defect is "located in a position deeper than the predetermined polishing-off amount".

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 28 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. With respect to claim 28, the precise metes and bounds of Applicants claimed invention are unclear and indefinite even in light of the Specification as originally filed. Specifically, it is not clear precisely what is required by the claimed inspecting step which is "carried out by monitoring the main surface mirror-finished by the precision polishing step and the defect that is located in a position deeper than the predetermined polishing-off amount and that is elicited by the precision step". In view of the noted lack of clarity issues with respect to the instant claim language, one of ordinary skill in the art would not necessarily be apprised of the precise metes and bounds of Applicants claimed invention.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims **7, 8, 12-17, and 20-28** are rejected under 35 U.S.C. 103(a) as being unpatentable over Walker (US 2,372,536) in view of Feng (US 6,596,042 B1) and Hagihara (US 2001/0051746 A1).

**(I). Walker (US 2,372,536):**

Walker teaches an improved method for preparing precision polished glass surfaces. The reference teaches that the method is applicable to the formation of highly polished optical lens, prisms, flats or other like glass objects which, in the absence of evidence to the contrary, are understood to display a “flatness” sufficient for use with one of the claimed source lasers or EUV [**Claims 20, 21**].

In accordance with the Walker disclosure and with particular regard to **Claims 7 and 12**, a glass substrate is first subjected to a rough grinding process. The reference teaches that after the rough grinding “it is extremely difficult to properly inspect a stock piece for the presence of relatively deep scratches or marrings or internal inclusions or striae or other imperfections” (pg 2, Column 2, Lines 46-74).

The inventors then subject the substrate to immersion in a reactive chemical agent or etching solution which removes the surface debris and rounds off the edges of the workpiece. Walker discloses that after the etching treatment, “any relatively deep surface scratches or other mars will now be readily discernible”. Since this chemical etching reaction acts upon “all surface portions”, the solution is understood to provide an isotropic etch of the substrate [**Claim 23**]. It is therefore understood that surface

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defects are “elicited” through etching process which visually magnifies the surface defect during an inspection of the surface.

The thus etched substrate is further subject to a fine polishing or precision polishing (Page 3, Column 2, Lines 45-46). After said precision polishing, the substrate is optionally subjected to a final dip or “cleaning step” in an etchant solution or chemical debris-clearing solution (Page5, Lines 17-38) [**Claim 8, 13**]

Walker teaches that etch rate of the etchant or cleaning solutions may be controlled by tailoring the ratio of solution constituent hydrofluoric and sulfuric acids, the substrate immersion time, and the bath temperature (Page 3, Column 1, line 44 through Column 2, line 26). The Walker reference is silent regarding a particular limitation upon the amount of material removed from either the etching step or the final cleaning step as set forth in Claims 15 and 17, respectively, or upon the etch rate of the etching step as per claims 24 and 25. Walker further is silent on the nature of the abrasive utilized in the polishing procedures as required in claim 22 or upon the root mean square roughness of the in final optical element as per claim 14.

With respect to **Claims 15** and newly submitted **Claims 24 and 25**, it would have been well within the purview of one of ordinary skill in the art at the time of the invention to provide a cleaning step etch of between 0 to 10nm depth [**Claim 15**] and to likewise control the etch rate to within the claimed ranges of between 0.2nm/min and 2 nm/min [**Claims 24 and 25**]. Restated, Walker teaches that the factors affecting etch rate and

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etch depth, such as etchant concentration, immersion time, and bath temperature, are subject to routine experimentation and optimization. It follows, absent any evidence showing substantially unexpected results, that one of ordinary skill in the art at the time of the invention would have arrived at the claimed etch rates and/or etch depths through no more than routine optimization of the disclosed process.

**(II.) Feng (US 6,596,042 B1):**

Next, the reference to Feng (US 6,596,042 B1) teaches common techniques, materials, and tolerances considered to be known to skilled practitioners in the field of precision polishing or Chemical-Mechanical polishing (CMP). First, the reference teaches that known slurry formulations comprising silica or ceric oxide are have been developed with ceric oxide being recognized as the most efficient abrasive towards silicon dioxide (e.g. glass) (Column 1, lines 23-33). The reference in Example 4 (Column 5, lines 3-33) further teaches that RMS roughness values of less than 1 angstrom and silica removal rates of less than 85 angstroms/minute are achievable by precision polishing with slurries of silica and/or cerium oxide [**Claim 27**].

In light of the Feng disclosure and absent any compelling or unexpected results to the contrary, it is the Examiners position that precision polishing operations which use colloidal silica and/or cerium oxide abrasive particles [**Claim 22**] and which remove between 10 and 200nm of silica [**Claim 17**] to yield a surface RMS value of 0.2nm [**Claim 14**] are well within the prevue of one of ordinary skill in the art.



**(III.) Hagihara (US 2001/0051746 A1)**

The reference to Hagihara relates a method for precision polishing a substrate which provides a minimum "roll-off" (edge rounding of end sides of the substrate) in the polishing process. It is understood by the Examiner that the process termed as "roll-off" in the instant reference is essentially equivalent to applicants claimed "amount of a turned-down edge" of a substrate.

Hagihara discloses that reducing roll-off in glass hard drive substrates is a recognized goal in glass hard drive substrate manufacturing since decreasing roll-off increases data recording area and subsequently leads to higher hard drive capacities. The reference explicitly teaches that various methods are known which can reduce this roll-off effect, "such as making a polishing pad more rigid, and making a polishing load smaller (Page 1, ¶[0004]). The reference continues by disclosing a particular polishing agent which results in a roll off value of "0.2  $\mu\text{m}/\mu\text{m}$  or less, more preferably 0.15 $\mu\text{m}/\mu\text{m}$  or less, still more preferably 0.10  $\mu\text{m}/\mu\text{m}$  or less". It follows from the Hagihara disclosure that the claimed "turned-down edge" tolerances would be recognized as conventional by one of ordinary skill in the art at the time of the invention. Said claimed ranges would have been achieved through no more than routine experimentation and optimization by a skilled artisan seeking to fabricate a precision polished HD substrate according to the Walker method.

Applicants newly submitted amendments to claims 7 and 12 require in part that the etching step is carried out "on the condition that a polishing-off amount is reduced in

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the precision polishing step and subsequently so that a "turned-down edge" falls within the stated range after said precision polishing. A similar limitation is presented in Applicants newly presented **claim 26**, wherein it is set forth that the etching is executed in under such conditions that defects are magnified and the polishing-off amount is reduced during the precision polishing step. Finally, newly presented **claim 28** requires the previously addressed rough polishing, etching, precision polishing and inspecting steps. Claim 28 further apparently requires that the inspecting step requires a comparison between a predetermined polishing-off amount and the depth of the defect elicited by the inspection step.

To summarize the aforementioned limitations from claims 7,12, 26, and 28, it is the Examiners understanding According to the claimed invention that the etching step is carried out in order to "polish-off" enough material to eliminate the surface defect while minimize the total amount of material removed during the precision polishing step. The Walker reference speaks directly to this issue noting that;

"In every case it has been found that the employment of one or more of such clearing operations invariably reduces the total amount of grinding and/or polishing and/or other finishing operations which may be required to provide the perfectly finished final product" (page 5, left column, lines 27-33). "Thus, an accurate guide is furnished for the fine grinding process because it will be apparent that until such time as all of the bright points are eliminated the fine grinding reduction process must be continued to obtain accurate leveling of the surface and elimination of any relatively deep scratches or gouge marks which were made by the coarse grinding operation."

In short, the Walker defect eliciting process decreases the amount of material required for removal during the “polishing-off” step necessary to achieve a perfectly finished final product. Walker further teaches that the elicited defects provide a visual guide or assessment regarding the precise amount of material required to eliminate the surface defects. Where the goal of Walker is to eliminate the elicited defect from the substrate surface, Walker, in essence, implicitly teaches a comparison between the depth of the elicited defect and the amount of material removed by the precision polishing step. Minor modifications to the Walker disclosed process not explicitly covered by the eliciting and precision polishing steps would have represented obvious extensions over the prior art teachings absent compelling evidence to the contrary.

In summary, the cited prior art references to Walker, Feng, and Hagihara all relate to fabrication of highly planar and defect free glass substrates such as may be found for example in the glass hard drive substrate manufacturing arts.

Walker teaches essentially every element of applicants claimed method including the steps of 1) rough polishing a main surface of a glass substrate, 2) eliciting defects or cracks in the main surface by immersing the substrate in an etching solution, and 3) subsequently subjecting the substrate to a precision polishing step. Walker further teaches that the factors affecting etch rate and etch depth, such as etchant concentration, immersion time, and bath temperature, are subject to routine experimentation and optimization. Walker also instructs that the eliciting step reduces

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the amount of precision polishing and further reduces the "polishing-off" amount required to remove surface defects.

Feng relates common abrasive materials for use in surface precision polishing operations and also teaches process tolerances (e.g. substrate root mean square roughness values (RMS) and substrate material removal depths) which are deemed conventional at the time of the invention. Similarly, Hagihara teaches that the effects of "edge roll-off", (e.g. the "amount of a turned-down edge" of a substrate) was appreciated by practitioners in the art. Hagihara further demonstrates that the claimed "turned-down edge" tolerances would be viewed as merely routine.

### ***Response to Arguments***

With respect to Applicants arguments directed against the rejection of claims 7 and 12 under 35 U.S.C. §112, second paragraph, Applicant is advised that no nexus was provided between the etching step and the "load" applied during the precision polishing step. Specifically, application of a load implies some apparatus, machine, or at the least some body or mass acting against another body. The claims as previously presented fail to bridge the gap between the claimed etching step and the load applied during a precision polishing step such that one of ordinary skill in the art would not necessarily be apprised of the scope of the claimed invention. Specifically, it is not evident what is applying the claimed load, to what and under what circumstances the claimed load is applied.

Although the instant rejection is circumvented by Applicants instant claim amendments, the basis for the originally presented rejection under §112, second paragraph stands as previously set forth in the February 13, 2008 Official Action.

With respect to the rejection of claims under 35 U.S.C. §103(a), Applicant alleges that “the grinding step is different from a fine polishing step” (see page 10). Applicant further asserts that “there is no disclosure at all in Walker about etching a roughly polished surface prior to a precision polishing step ... so as to reduce the polishing-off amount and the resultant turned-down amount”. Applicant concludes that Walker fails to suggest (1) the necessity of reducing a polishing-off amount in a precision polishing step nor (2) the desirability of solving a loading failure problem of stock pieces.

The Examiner disagrees.

In response and with particular reference to the above presented rejection, Walker explicitly teaches that “In every case it has been found that the employment of one or more of such clearing operations invariably reduces the total amount of grinding and/or polishing and/or other finishing operations which may be required to provide the perfectly finished final product” (page 5, left column, lines 27-33). Restated, Walker explicitly acknowledges the benefit of reducing the amount of material needed for removal in order to eliminate surface defects in a substrate. Walker further explicitly links this benefit with the defect eliciting step. As noted above with respect to the

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Hagihara (US 2001/0051746 A1) reference, the "turned-down" amount appears to be conventional tolerance in the art with respect to optical disk substrates, and Applicant has failed to provide any convincing rebuttal to this position.

6. To the extent that Applicant alleges a distinction between the grinding and rough polishing step, Applicant has failed to set forth any meaningful distinction between the process set forth in the prior art and that presently claimed. It follows that Applicant's arguments on this matter fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

### ***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON L. LAZORCIK whose telephone number is (571)272-2217. The examiner can normally be reached on Monday through Friday 8:30 am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Examiner, Art Unit 1791